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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,326	11/17/2003	Yu-Liang Lin	24061.51 (TSMC2002-1216)	5111
42717	7590	07/19/2005	EXAMINER	
HAYNES AND BOONE, LLP 901 MAIN STREET, SUITE 3100 DALLAS, TX 75202			NGUYEN, THANH T	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/715,326	LIN ET AL.	
	Examiner	Art Unit	
	Thanh T. Nguyen	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 18-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>5/13/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 18-32 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention, the requirement having been traversed.

Applicant's election with traverse of Group I, claims 1-17 drawn to a method claims is acknowledged. The traversal is on the ground(s) that the subject matter of all claims 1-32 is sufficiently related that a thorough search for the subject matter of any one group of the claims would encompass a search for the subject matter of the remaining claims. This is not found persuasive because claims 18-32 would require further search and for the reason of the last Office Action. The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

The information disclosure statement filed on 5/13/04 has been considered.

Oath/Declaration

Oath/Declaration filed on 11/17/03 has been considered.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 9, 11-14, 16, 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Morita et al. (U.S. Patent Publication No. 2003/0003770).

Regarding to claim 1, A method for fabricating an insulating layer on a substrate, comprising:
providing a fluid to a substrate (11), wherein the fluid is provided in an aerosol form (paragraph# 140+);
generating a supercritical process environment proximate to the substrate, the proximate supercritical process environment having a supercritical process temperature and a supercritical process pressure for altering the fluid(paragraph# 141+); and
placing the substrate in contact with the altered fluid, wherein the insulating layer is formed on the substrate by a reaction between the substrate and the fluid (paragraph# 143+).

Regarding to claim 3, converting the fluid from a liquid to the aerosol form; and
distributing the fluid in the aerosol form using a nebulizer ((paragraph# 140+).

Regarding to claim 4, the fluid comprises water (paragraph# 140+);

Regarding to claim 5, the fluid is heated prior to being provided to the processing chamber (fig. 2, 4 paragraph# 80+).

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Regarding to claim 9, heating the substrate to the supercritical process temperature, wherein the water is heated to the supercritical process temperature by the heated substrate (paragraph# 141+).

Regarding to claim 11, heating the substrate includes irradiating the substrate with infrared radiation (see paragraph# 71, 178).

Regarding to claim 12, removing the substrate from contact with the heated fluid, wherein the substrate is repeatedly placed in contact with the heated fluid and removed from contact with the heated fluid until a desired thickness of the insulating layer is formed (paragraph# 146-147, figure 7b-7c).

Regarding to claim 13, forming a conductive layer (13) over the insulating layer (12, see figure 1C).

Regarding to claim 14, removing at least a portion of the insulating layer to form a spacer around a gate of a transistor (32, see figures 6a-6b).

Regarding to claim 16, supercritical process temperature is approximately 374°C and wherein the supercritical process pressure is approximately 221 atmospheres (paragraph# 87).

Regarding to claim 17, determining whether the insulating layer is of a predetermined thickness, and maintaining the contact between the substrate and the heated fluid if the insulating layer is not of the predetermined thickness (paragraph# 146-147, figure 7b-7c).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2, 6-8, 10, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (U.S. Patent Publication No. 2003/0003770) as applied to claims 1, 3-5, 9, 11-14, 16, 17 above in view of Reitz et al. (U.S. Patent Publication No. 2002/0142218), Yamanaka (U.S. Patent Publication No. 20030013280), Christiansen et al. (U.S. Patent Publication No. 20030218189), and Morita (U.S. Patent Publication No. 2001/0037860).

Morita et al. teaches forming an insulating layer on the substrate by a reaction between the substrate and the fluid. However, the reference does not teach converting the fluid from a liquid to the aerosol form, and distributing the fluid in the aerosol form using an ultrasonic applicator, the substrate comprises a diamond, the substrate including a n-type region and a p-type region, the p-type region comprises a boron doped region, the n-type region comprises a deuterium-boron complex region, the n-type layer formed by a plasma treatment of the boron doped region, heating a pedestal holding the substrate with a resistive coil, and the insulating layer isolates a plurality of interconnections in a damascene structure.

Reit teaches converting the fluid from a liquid to the aerosol form, and distributing the fluid in the aerosol forms using an ultrasonic applicator (see paragraph# 65).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at

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the time of the invention was made would converting the fluid from a liquid to the aerosol form, and distributing the fluid in the aerosol forms using an ultrasonic applicator in process of Morita et al. in process of Reit because the process would Improve aerosol delivery apparatuses for reactant systems.

Yamanaka teaches the substrate comprises diamond and including a n-type region and a p-type region (see paragraph# 639), p-type region comprises a boron doped region (see paragraph# 501), heating a pedestal holding the substrate with a resistive coil (see figure 7, paragraph# 253).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would form a the substrate comprises diamond and including a n-type region and a p-type region, p-type region comprises a boron doped region, and heating a pedestal holding the substrate with a resistive coil in process of Morita et al. as taught by Yamanaka because the process would form a highly efficient emitter properties.

Christiansen et al. teaches forming the n-type region comprises a deuterium-boron complex region, the n-type layer formed by a plasma treatment of the boron doped region (see paragraph# 71).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would form forming the n-type region comprises a deuterium-boron complex region, the n-type layer formed by a plasma treatment of the boron doped region in process of Morita et al. as taught by Christiansen et al. because the process would form a more conductive region in the substrate.

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Morita teaches the insulating layer isolate a plurality of interconnections in a damascene structure (see paragraph# 88).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would to form the insulating layer isolate a plurality of interconnections in a damascene structure in process of Morita et al. as taught by Morita because the process would provide the better insulation between multiple interconnection in the semiconductor device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (571) 272-1695, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached on (571) 272-1702. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (See **MPEP 203.08**).

A handwritten signature in black ink, appearing to read 'Thanh', is located at the bottom right of the page.

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Thanh Nguyen
Patent Examiner
Patent Examining Group 2800

TTN